4-15-1969

Test 1006: Case 1470 Traction King (Diesel)

Tractor Museum
University of Nebraska-Lincoln, TractorMuseumArchives@unl.edu

NEBRASKA TRACTOR TEST 1006 – CASE 1470 TRACTION KING DIESEL

POWER TAKE-OFF PERFORMANCE

Hp	Crank-shaft speed rpm	Fuel Consumption: Gal per hr	Fuel Consumption: Lb per hp-hr	Fuel Consumption: Hp-hr per gal	Temperature Degrees F: Cooling medium	Temperature Degrees F: Air wet bulb	Temperature Degrees F: Air dry bulb	Barometer inches of Mercury
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours								
144.89	2000	8.188	0.389	17.70	190	55	75	28.743
VARYING POWER AND FUEL CONSUMPTION—TWO HOURS								
128.39	2086	7.523	0.403	17.07	199	55	74	.....
0.00	2188	2.112	.....	.....	183	56	76	.....
65.86	2136	4.743	0.495	13.89	186	56	76	.....
143.45	2000	8.116	0.389	17.67	192	56	75	.....
33.48	2163	3.460	0.711	9.68	183	56	76	.....
97.37	2108	6.122	0.432	15.90	187	55	75	.....
Av 78.09	**2130**	**5.346**	**0.471**	**14.61**	**188**	**56**	**75**	**28.730**

DRAWBAR PERFORMANCE

Hp	Draw-bar pull lbs	Speed miles per hr	Crank-shaft speed rpm	Slip of drivers %	Fuel Consumption: Gal per hr	Fuel Consumption: Lb per hp-hr	Fuel Consumption: Hp-hr per gal	Temp Degrees F: Cool-ing med	Temp Degrees F: Air wet bulb	Temp Degrees F: Air dry bulb	Barom-eter inches of Mercury
VARYING DRAWBAR POWER AND FUEL CONSUMPTION WITH BALLAST											
Maximum Available Power—Two Hours—4th Gear											
126.86	9225	5.16	2000	3.32	8.034	0.436	15.79	185	50	65	29.010
75% of Pull at Maximum Power—Ten Hours—4th Gear											
103.41	7145	5.43	2089	2.66	7.188	0.478	14.39	187	51	65	29.041
50% of Pull at Maximum Power—Two Hours—4th Gear											
71.23	4806	5.56	2120	1.75	5.575	0.538	12.78	186	46	54	29.033
MAXIMUM POWER WITH BALLAST											
108.44	17742	2.29	2083	12.57	1st Gear			187	50	64	29.000
123.54	15882	2.92	1999	9.01	2nd Gear			185	50	63	28.910
130.22	12317	3.96	2001	5.29	3rd Gear			189	50	63	28.900
132.06	9635	5.14	2000	3.65	4th Gear			188	50	64	28.890
125.75	7246	6.51	2000	2.61	5th Gear			186	50	63	28.880
127.63	5732	8.35	1999	2.01	6th Gear			189	50	65	28.880
125.98	4328	10.92	1998	1.56	7th Gear			189	50	64	28.880
120.68	3230	14.01	2002	1.18	8th Gear			185	50	64	28.880
MAXIMUM PULL WITHOUT BALLAST											
99.81	16154	2.32	2093	12.09	1st Gear			188	52	69	28.970

VARYING DRAWBAR PULL AND TRAVEL SPEED WITH BALLAST—4th Gear

Pounds pull	9635	10331	10843	11050	10855	10245
Horsepower	132.06	126.23	118.29	105.11	88.48	69.57
Crankshaft speed rpm	2000	1790	1600	1399	1197	995
Miles per hour	5.14	4.58	4.09	3.57	3.06	2.55
Slip of Drivers, %	3.65	4.08	4.23	4.51	4.37	4.08

TIRES, BALLAST and WEIGHT		**With Ballast**	**Without Ballast**
Rear tires	—No, size, ply & psi	Two 28.1-26; 10; 16	Two 28.1-26; 10; 16
Ballast	—Liquid	None	None
	Cast iron	None	None
Front tires	—No, size, ply & psi	Two 28.1-26; 10; 16	Two 28.1-26; 10; 16
Ballast	—Liquid	None	None
	Cast iron	605 lb each	None
Height of drawbar		18 inches	18 inches
Static weight with operator—Rear		7905 lb	8120 lb
Front		10605 lb	9180 lb
Total		18510 lb	17300 lb

Department of Agricultural Engineering

Dates of Test: April 15 to April 23, 1969

Manufacturer: J. I. CASE COMPANY, RACINE, WISCONSIN

FUEL, OIL and TIME Fuel No 2 Diesel **Cetane No** 54.3 (rating taken from oil company's typical inspection data) **Specific gravity converted to 60°/60°** 0.8260 **Weight per gallon** 6.878 lb **Oil** SAE 20-20W **API service classification** MS, DS **To motor** 2.927 gal **Drained from motor** 2.398 **Transmission lubricant** Type A **Final-drive lubricant** SAE 140 EP **Total time engine was operated** 58 hours.

ENGINE Make Case Diesel **Type** 6 cylinder vertical with turbo-charger **Serial No** 2246696 **Crankshaft mounted** lengthwise **Rated rpm** 2000 **Bore and stroke** 4⅝" x 5" **Compression ratio** 16.5 to 1 **Displacement** 504 cu in **Cranking system** 24 volt electric (two 12 volt batteries) **Lubrication** pressure **Air cleaner** dry type with replaceable paper element **Oil filter** full flow replaceable cartridge **Oil cooler** engine coolant heat exchanger for crankcase oil **Fuel filter** replaceable primary and secondary filter cartridges **Muffler** was used **Cooling medium temperature control** two thermostats.

CHASSIS Type 4-wheel drive **Serial No** 9810032 **Tread width** rear 84" front 84" **Wheel base** 102" **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 54.6" Vertical distance above roadway 46.7" Horizontal distance from center of rear wheel tread 0" to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio **Advertised speeds mph** first 2.46 second 3.14 third 4.10 fourth 5.22 fifth 6.54 sixth 8.36 seventh 10.88 eighth 13.93 reverse 3.82, 4.87, 10.16 and 12.95 **Clutch** dry disc operated by foot pedal **Brakes** hydraulically operated caliper-type disc brake located on drive shaft **Steering** hydrostatic for front wheels and independent hydraulic for rear wheels **Turning radius** (on concrete surface with front wheel steering) right 286" left 286" (on concrete surface with four wheel steering) right 197" left 197" **Turning space diameter** (on concrete surface with front wheel steering) right 600" left 600" (on concrete surface with four wheel steering) right 418" left 418" **Power take-off** 1000 rpm at 2000 engine rpm.

REPAIRS and ADJUSTMENTS: New fuel filter cartridges were installed during preliminary PTO run.

REMARKS: All test results were determined from observed data obtained in accordance with the SAE and ASAE test code.

The pull in 1st gear was limited to avoid tractor bouncing.

We, the undersigned, certify that this is a true and correct report of official Tractor Test 1006.

L. F. LARSEN

Engineer-In-Charge

G. W. STEINBRUEGGE, Chairman
W. E. SPLINTER
D. E. LANE
Board of Tractor Test Engineers

The University of Nebraska Agricultural Experiment Station
E. F. Frolik, Dean; H. W. Ottoson, Director; Lincoln, Nebraska

EXPLANATION OF TEST REPORT

GENERAL CONDITIONS

Each tractor is a production model equipped for common usage. Power consuming accessories can be disconnected only when it is convenient for the operator to do so in practice. Additional weight can be added as ballast if the manufacturer regularly supplies it for sale. The static tire loads and the inflation pressures must conform to recommendations in the Tire Standards published by the Society of Automotive Engineers.

PREPARATION FOR PERFORMANCE RUNS

The engine crankcase is drained and refilled with a measured amount of new oil conforming to specifications in the operators manual. The fuel used and the maintenance operations must also conform to the published information delivered with the tractor. The tractor is then limbered-up for 12 hours on drawbar work in accordance with the manufacturer's published recommendations. The manufacturer's representative is present to make appropriate decisions regarding mechanical adjustments.

The tractor is equipped with approximately the amount of added ballast that is used during maximum drawbar tests. The tire tread-bar height must be at least 65% of new tread height prior to the maximum power run.

BELT OR POWER TAKE-OFF PERFORMANCE

Maximum Power and Fuel Consumption. The manufacturer's representative makes carburetor, fuel pump, ignition and governor control settings which remain unchanged throughout all subsequent runs. The governor and the manually operated governor control lever is set to provide the high-idle speed specified by the manufacturer for maximum power. Maximum power is measured by connecting the belt pulley or the power take-off to a dynamometer. The dynamometer load is then gradually increased until the engine is operating at the rated speed specified by the manufacturer for maximum power. The corresponding fuel consumption is measured.

Varying Power and Fuel Consumption. Six different horsepower levels are used to show corresponding fuel consumption rates and how the governor causes the engine to react to the following changes in dynamometer load: 85% of the dynamometer torque at maximum power; minimum dynamometer torque, ½ of the 85% torque; maximum power, ¼ and ¾ of the 85% torque. Since a tractor is generally subjected to varying loads the average of the results in this test serve well for predicting the fuel consumption of a tractor in general usage.

DRAWBAR PERFORMANCE

All engine adjustments are the same as those used in the belt or power take-off tests. If the manufacturer specifies a different rated crankshaft speed for drawbar operations, then the position of the manually operated governor control is changed to provide the high-idle speed specified by the manufacturer in the operating instructions.

Varying Power and Fuel Consumption With Ballast. The varying power runs are made to show the effect of speed-control devices (engine, governor, automatic transmission, etc.) on horsepower, speed and fuel consumption. These runs are made around the entire test course which has two 180 degree turns with a minimum radius of 50 feet. The drawbar pull is set at 3 different levels as follows: (1) as near to the pull at maximum power as possible and still have the tractor maintain the travel speed at maximum horsepower on the straight sections of the test course; (2) 75% of the pull at maximum power; and (3) 50% of the pull at maximum power. Prior to 1958, fuel consumption data (10 hour test) were shown only for the pull obtained at maximum power for tractors having torque converters and at 75% of the pull obtained at maximum power for gear-type tractors.

Maximum Power with Ballast. Maximum power is measured on straight level sections of the test course. Data are shown for not more than 12 different gears or travel speeds. Some gears or travel speeds may be omitted because of high slippage of the traction members or because the travel speed may exceed the safe-limit for the test course. The maximum safe speed for the Nebraska Test Course has been set at 15 miles per hour. The slippage limits have been set at 15% and 7% for pneumatic tires and steel tracks or lugs, respectively. Higher slippage gives widely varying results.

Maximum Pull without Ballast. All added ballast is removed from the tractor. The drawbar pull is determined at slip limits of 15% for pneumatic tires or 7% for steel tracks or lugs. The tractor is operated at the fastest possible travel speed.

Varying Power and Travel Speed with Ballast. Travel speeds corresponding to drawbar pulls beyond the maximum power range are obtained to show the "lugging ability" of the tractor. The run starts with the pull at maximum power; then additional drawbar pull is applied to cause decreasing speeds. The run is ended by one of three conditions: (1) maximum pull is obtained, (2) the maximum slippage limit is reached, or (3) some other operating limit is reached.

For additional information about the **Nebraska Tractor Tests** write to the **Department of Agricultural Engineering, University of Nebraska, Lincoln, Nebraska.**

CASE 1470 TRACTION KING DIESEL